

A new subgenus of *Orthomeria* Kirby, 1904 and a new species from Danum Valley, Sabah.

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Abstract

A new subgenus *Orthomeria* (*Parorthomeria*) is established with *Orthomeria* (*Parorthomeria*) *alexis* (Westwood, 1859) as the type species. *Orthomeria* (*Parorthomeria*) *turneri* n.sp. is described from a male and female collected at Danum Valley, Sabah, one specimen from the Baram river region of Sarawak, and from two specimens previously recorded by the author as variations of *O. alexis*. The new species is closely related to *alexis*.

Keywords

Phasmida, *Parorthomeria* new subgenus, *Orthomeria* (*Parorthomeria*) *turneri* new species, *Orthomeria alexis*, Danum Valley, Sabah, Borneo.

Introduction

In 2005 I received some specimens of Phasmida for identification. The material was collected by canopy fogging and from leaf-litter samples by Dr. Ed Turner (Cambridge University), and stored in alcohol. Several species were readily identifiable while still in tubes of alcohol, and a pair of *Orthomeria* were provisionally identified as *O. alexis* (Westwood, 1859). When the specimens had been removed from alcohol, set, and dried, the *Orthomeria* were found to be rather small when compared to the measurements in *Phasmids of Borneo* (Bragg, 2001: 304, table 29). On closer examination they were found to be a new species. The similarity to *alexis* led to a re-examination of two females listed as “*Orthomeria alexis*–variation” (Bragg, 2001: 309), although larger than the specimens from Danum, these are the same as the new species. A fifth specimen was subsequently located in the Natural History Museum, London. All type specimens of *alexis* have been examined, and a lectotype is designated.

The following codens are used: BMNH the Natural History Museum, London, U.K.; CUMZ Cambridge University Museum of Zoology, Cambridge, U.K.; MH Mel Herbert's collection; PEB the author's collection; RMNH Leiden Natural History Museum, The Netherlands; SMSM the Sarawak Museum, Kuching, Sarawak, Malaysia.

Orthomeria Kirby, 1904

Orthomeria, Kirby, 1904: 420; Bragg, 2001: 305; Zompro, 2004: 89. Type species: *Phasma* (*Ascephasma*) *forstenii* de Haan, 1842, by original designation.

Diagnosis

Aschiphasmata: Aschiphasmata: Aschiphasmata. Head rounded, more or less globular; fore femora straight, not incurving at the base; femora without distinct carinae. Tegmina present, usually more or less circular but longitudinally folded so that they appear semicircular. Males and females very similar in coloration and general form, males are more slender and slightly shorter than females. Poculum generally quite deep when compared to other members of the tribe, often appearing similar to the female operculum. Eggs are laterally compressed spheres (lentic-shaped).

The genus *Orthomeria* currently contains nine species and, as previously noted (Bragg, 2001: 305), two of these: *alexis* (Westwood, 1859) and *cuprinus* Bragg, 2001, differ from the rest of the genus by being more slender and by having setose eggs. Previously I considered it unnecessary to create a new genus for these species (Bragg, 2001: 314); however, I now find a need to distinguish these species from the rest of the genus so propose placing these two,

and the new species described here, in a new subgenus.

The following key, which is based on the first couplet of my key to *Orthomeria* (Bragg, 2001: 305), serves to differentiate the two subgenera.

1. Mesonotum thickened, not or only slightly more than one-and-a-half times as long as wide.
..... *Orthomeria (Orthomeria)* Kirby, 1904
- Mesonotum relatively slim, about twice as long as wide, or longer; legs green.
..... *Orthomeria (Parorthomeria)* **new subgenus**

***Orthomeria (Orthomeria)* Kirby, 1904**

Orthomeria, Kirby, 1904: 420. Type species: *Phasma (Ascephasma) forstenii* de Haan, 1842, by original designation.

Diagnosis: Characteristics as for *Orthomeria* but restricted to those species with a mesonotum which is less, or only slightly more, than one-and-a-half times as long as wide, and with eggs that are not setose. In most species the body and legs are predominantly dark brown or black, they are rarely green. The wings are usually predominantly black or very dark, some species with lighter colours near the base.

This subgenus contains seven described species, and Dr Oliver Zompro (Kiel, Germany) has collected material from the Philippines that includes undescribed species which belong here.

***Orthomeria (Parorthomeria)* n. subgen.**

Type species *Aschipasma alexis* Westwood, 1859, by present designation.

Diagnosis: Characteristics as for *Orthomeria* but with the mesonotum of both sexes about twice as long as wide, or longer and with eggs which are setose. In all three known species the legs are green, with the apical third of fore femur black; body green or light brown (not black or dark brown), hind wings light coloured, either pale with darkened margins, or uniformly copper-coloured.

This subgenus contains three species: *O. (P.) alexis* (Westwood, 1859), *O. (P.) cuprinus* Bragg, 2001, and *O. (P.) turneri* **n.sp.**

Etymology: The name *Parorthomeria* is a previously unpublished name that was used by Klante on specimens of *Orthomeria cuprinus* in RMNH (Bragg, 2001: 314).

Key to *Parorthomeria*

1. Mesonotum just twice as long as wide; anal region of wings uniformly copper, costal region green or copper without any black.
..... *Orthomeria (Parorthomeria) cuprinus* Bragg, 2001
- Mesonotum more than twice as long as wide; anal region of wings yellowish with dark margins, costal region green with brown or black longitudinal stripes. 2
2. Wings with wide dark band on the margin (fig. 1). Male 35-40mm, apex of poculum notched (fig. 3); female 46-53mm, apex of abdomen rounded (fig. 5).
..... *Orthomeria (Parorthomeria) alexis* (Westwood, 1859)

- Wing with dark band on margin very narrow after about vein A₇ (fig. 2). Male 30mm, apex of poculum straight (fig. 4); female 37-44.5mm, apex of abdomen pointed (fig 7).
..... *Orthomeria (Parorthomeria) turneri* **n.sp.**

***Orthomeria (Parorthomeria) alexis* (Westwood, 1859) (figs. 1, 3, 5, & 6.)**

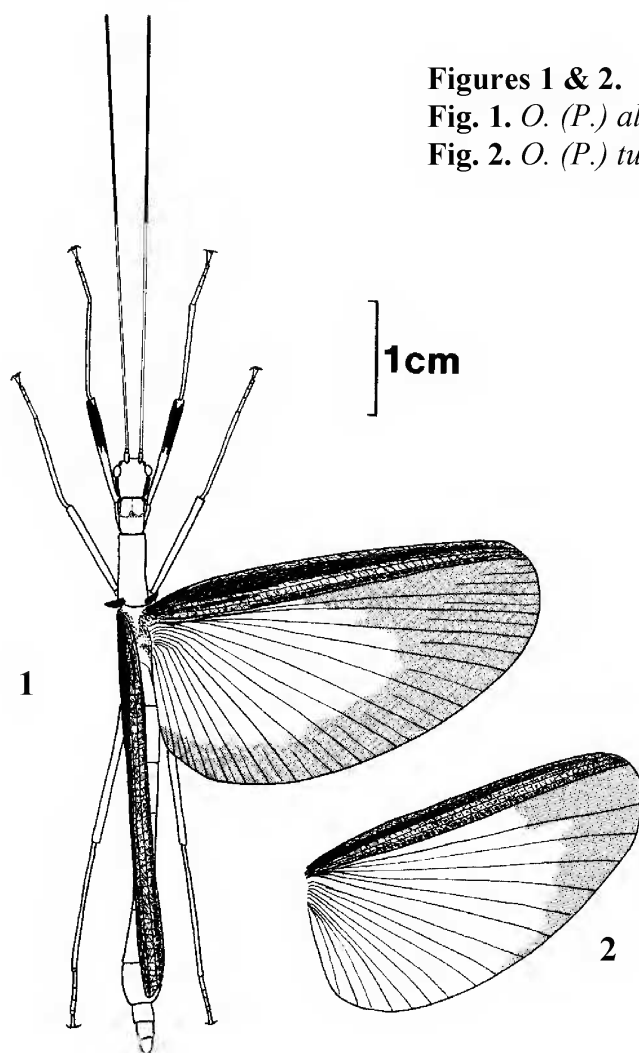
Aschipsma alexis Westwood, 1859: 94, pl. 28.3 (♀), 23a (♀), 23b (♂). Lectotype [selected here] ♂ (OXUM 503, 1/3) Sarawak. Wallace. Paralectotypes: 2♀♀ (OXUM 503 2/3, 3/3), Sarawak. Wallace; ♂, ♀ (BMNH, 56-44) Sarawak. Wallace; ♂ (BMNH, no data label).

Orthomeria alexis (Westwood); Kirby, 1904: 420; Günther, 1935a: 4; Bragg, 2001: 306, figs 110a (♀), 110c-f (egg), [not fig 110b – see *O. turneri*].

Ascepasma alexis Westwood; Redtenbacher, 1906: 77; Werner (1934b): 2.

Presbistus marginatus; Günther, 1943: 151 [not *P. marginatus* Redtenbacher] synonymised by Bragg, 2001: 306.

All six syntypes appear to be the same species but a lectotype selection was considered desirable because of the similarity to *O. (P.) turneri* **n.sp.** One BMNH specimen is unlabelled, however the method of preservation (style of setting, and piece of wood inserted in the abdomen) is consistent with the syntypes that have data labels.



Figures 1 & 2.

Fig. 1. *O. (P.) alexis* female.

Fig. 2. *O. (P.) turneri* wing of female.

***Orthomeria (Parorthomeria) cuprinus* Bragg, 2001**

Orthomeria cuprinus Bragg, 2001: 312, figs 112a (♂), 112b (♀), 112c-f (egg), plate 4c (♂). Holotype ♀ & eggs (PEB-2197) Sarawak, Tarum (nr Debak), collected mating with PEB-2198, P.E. Bragg, 25.x.1994. Paratypes: 16♀♀, 12♂♂ [for details see Bragg, 2001, and note below]

There was an error in the data listed for some of the paratypes in my own collection: on the second line of data for specimens from Sarawak “7♂♂ (PEB-2105-2109) 05.xi.1994” should read: 5♂♂ (PEB-2205-2209) 05.xi.1994.

Some of the type specimens from my own collection have subsequently been distributed to museums as follows:

To BMNH: Holotype ♀ (PEB-2197), Paratypes: ♂ (PEB-2198), ♂ (PEB-2209).

To OXUM: Paratypes: ♀ (PEB-2202), ♂ (PEB-2206).

To CUMZ: Paratype: ♀ (PEB-2204).

***Orthomeria (Parorthomeria) turneri* n.sp.**

Orthomeria alexis-variation; Bragg, 2001: 309, fig 110b.

Material

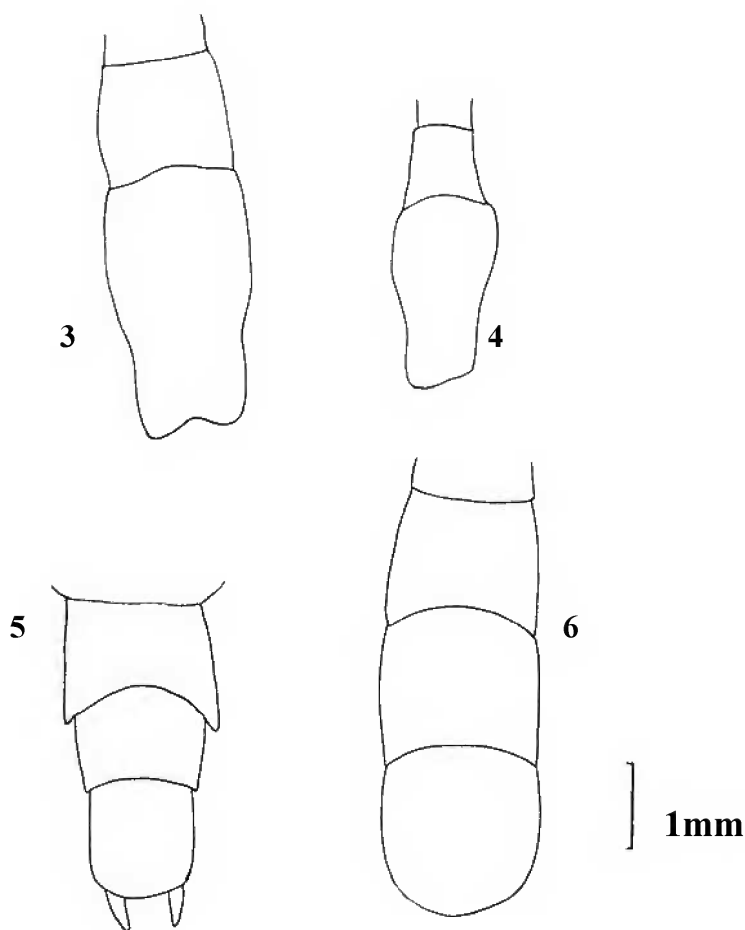
Holotype ♀ (CUMZ) SABAH, Danum Valley, Secondary forest. Sample 69S, Fogging. Ed Turner, 2002. Paratypes: ♂ (CUMZ) same data as holotype. ♀ (MH-15-1) BRUNEI, Sungai Mendaram, M. Herbert, v.1995. ♀ (PEB-2195) SARAWAK, near Betong on roadside vegetation, P.E. Bragg, 25.x.1994. ♀ (BMNH, 92-24) Baram, A. Everett, Oct. [18]91.

Diagnosis

Body and legs green, with black band down side of body. Wings yellowish with dark apex. Very similar to *O. alexis* in coloration and general appearance. Distinguished from *alexis* by smaller size (*alexis* ♂ 35-40mm, ♀ 46-53mm; *turneri* ♂ 30mm, ♀ 37-44.5mm), the darkened area of the wing not extending all around the margin, and usually by the presence of a longitudinal dark brown stripe along the centre of the pronotum and mesonotum (this has faded almost to invisibility on MH15-1). The apex of the male poculum is almost straight (not obviously notched), apex of anal segment with six teeth on the underside (3 on each side). The apex of the female's abdomen ends in a point (*alexis* is rounded).

Table 1. *Orthomeria (Parorthomeria) turneri* n.sp. Measurements in mm.

	♂	♀		♂	♀
Total length	30	c.37	Fore femur	5.7	6.6
Antennae	c. 20	c. 29	Fore tibia	5.2	6.0
Head	1.8	3.0	Fore tarsus	3.2	3.6
Pronotum	2.1	2.6	Mid femur	5.2	6.2
Mesonotum	3.6	4.5	Mid tibia	5.1	6.0
Metanotum	2.9	3.8	Mid tarsus	2.6	3.1
Median segment	2.0	2.5	Hind femur	7.3	9.3
Fore wing	0.7	1.2	Hind tibia	7.2	9.3
Hind wing	19.5	25.5	Hind tarsus	3.4	3.9



Figures 3-4.

Poculum of males.

Fig. 3. *O. alexis*.

Fig. 4. *O. turneri*.

Figures 5-8.

Dorsal view of abdomen.

Fig. 5. *O. alexis*, female.

Fig. 6. *O. alexis*, male.

Fig. 7. *O. turneri*, female.

Fig. 8. *O. turneri*, male.

Female (figs. 2, 7, 10 & 11)

Holotype discoloured due to having been stored in alcohol. Parts which are green in the female paratypes are pale brown in the holotype; coloration described here is based on the paratypes and photographs of my paratype. Body and legs bright green in life, body brown when preserved. Dorsal surface of head and thorax pale brown. Ventral margins of pronotum, mesonotum, and metanotum with a broad black stripe that continues on the head. Posterior half of pronotum and anterior half of mesonotum with a narrow dark brown longitudinal stripe; the stripe may be very indistinct. Apical third of antennae black, basal two thirds pale brown. Dorsal surface of 7th abdominal segment white in life, brown when preserved. Abdominal terga 8-10, and all sternites, mid brown. Apical half of fore femora black. Tegmina black with a central broad longitudinal stripe. Anterior margin of costal region of wing with a broad green stripe, the

remainder appears to be brown, except in the paratype from Sarawak which has four longitudinal stripes, two green and two brown; many veins in the costal region are green (colorless in the holotype). Anal region of wing translucent golden-yellow with the apical third dark brown, the darkened area continues along the margin but is almost insignificant beyond about the seventh anal vein. Whole of body and legs densely, finely setose; head without setae. Body length: holotype 37mm (CUMZ); others: 38mm (MH15-1) and 44.5mm (PEB-2195); BMNH 42mm with apex of abdomen missing (it also has only 3 legs – both fore legs & left hind).

Head as long as wide, smooth, rounded (the holotype has an uneven depression on the top of the head that I believe to be the result of the original preservation method). Antennae with about 60 segments, third segment twice as long as adjacent segments. Pronotum one-and-a-third times longer than wide, anterior half slightly swollen and with a longitudinal groove; pronotal foramen opens dorsally on the anterior margin. Mesonotum widening only slightly; just over twice as long as width of anterior margin (2x width of posterior margin). Metanotum longer than median segment. Metanotum and median segment and wider than mesonotum. Abdominal segment 2 narrowing, 3-4 of uniform width, 5-7 swollen laterally and ventrally, 8-10 short and narrowing, 10th with pointed apex. Lamina supraanalis not visible dorsally. Cerci tapering, straight, projecting beyond abdomen. Operculum moderately deep, apex rounded.

Hind legs reaching to the end of the abdomen. Femora only slightly longer than tibiae. Femora without dorsal carinae, ventral carinae unarmed. Tibiae rounded, without carinae. Tarsomeres 1-4 decreasing in length evenly.

Tegmina as wide as long, almost circular, but folded longitudinally. Wings deep and reaching to end of 7th segment.

Male (figs. 4, 8, & 10)

Coloration as in female holotype, (except 7th segment presumably not white). Body length 30mm.

Description as in female except for the following. Pronotum 1.2x longer than wide. Mesonotum 2.5x longer than width of anterior margin (about 2x width of posterior margin). Abdominal segments 2-7 narrowing slightly, 8th widening slightly, 8-10 short. Apex of 10th segment rounded; the ventral surface with three small spines on each side. Cerci projecting below and curving round the poculum; long, tapering, inward curving. Poculum long, slightly upcurving, apex down-turned and not quite symmetrical.

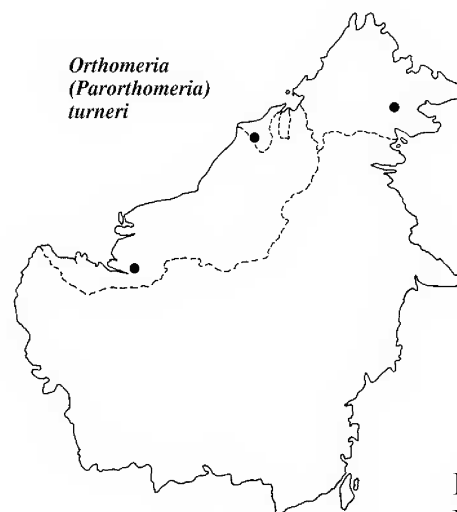


Figure 9. *O. (P.) turneri*.
Distribution in Borneo.



Figure 10. *Orthomeria (Parorthomeria) turneri* n.sp.: a) Female MH-15-1; b) Female PEB-2195; c) Female holotype CUMZ; d) Male CUMZ.



Figure 11. *O. (P.) turneri* n.sp. - female PEB-2195.



Figure 12. *O. (P.) turneri* n.sp.
Egg, lateral view.

Egg (fig. 12)

Six eggs were removed from the body of the female from Danum; two were underdeveloped or badly damaged. The eggs are setose, lentil-shaped; measurements (to nearest 0.05mm): length 1.60mm, height 1.25mm width 0.80mm. These are the smallest known phasmid eggs. A single egg was removed from the operculum of the largest paratype, this measured: length 1.75mm, height 1.50mm, width 0.90mm.

Etymology: This species is named after the collector of the Danum material, Dr. Ed Turner.

Comments

The holotype is not the best specimen, having lost its original colour and a leg, and a second leg is glued to card rather than attached to the body, and the head has a depressed area resulting from being preserved in alcohol. However, the holotype can be reliably associated with the male and I decided a poor quality pair is preferable to a holotype with no other geographically associated specimen. A female was chosen as the holotype because the distinction between *turneri* and *alexis* is clearer in the females.

The data on the BMNH specimen is handwritten in pencil and the collector's name is unclear; the date "Oct 91" clearly refers to October 1891, the BMNH accession number 92-24 is for 1892. The batch included four phasmids purchased from Mr E Gerard, and collected by Mr A Everett. The vague locality, Baram [river], is omitted from the distribution map (fig. 9).

Measurements for *alexis* that I gave in *Phasmids of Borneo* are from my own material and *Die Insektenfamilie der Phasmiden* (Redtenbacher, 1906) only, it is therefore possible that there is an overlap in the size of *alexis* and *turneri*. The wing patterns of most of the 153 specimens of *alexis* that I recorded (Bragg, 2001: 306-308) were examined, however, some in the collections of C.L. Chan and the Sarawak Museum (SMSM) do not have their wings open and re-examination of these to check the identity would be desirable.

Acknowledgements

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Postscript on Aschiphasmata in *Phasmids of Borneo*

The table of measurements for *Orthomeria* spp. in *Phasmids of Borneo* (Bragg, 2001: 304, table 29) has the column headings out of alignment, as does table 32 on page 346. Some of the data was omitted for the holotype of *Dajaca viridipennis* Bragg, 2001 (p. 353), the full data is as follows: Holotype ♂ (PEB-2196) Sarawak, Tarum (near Debak), P.E. Bragg, 25.x.1994.